Floodplains/Wetlands
and
Water Quality
Specialist Report

East Fork Boulder Creek Native Trout
Restoration Project
USDA-Forest Service-Dixie National Forest

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This document analyzes effects of the proposed East Fork Boulder Creek Native Trout Restoration project on water quality, floodplains, and wetlands. The alternatives that are analyzed, including actions that are not part of the Forest Service decision but connected to the project, are described in Appendix 1.

AFFECTED ENVIRONMENT

FLOODPLAINS/WETLANDS

The proposed treatments would take place within floodplains and wetlands of the project area as described in Appendix 1. The wetlands are generally confined to a small area adjacent to the streams. There are also a number of springs and seeps in the various drainages.

The cumulative effects area for effects to floodplains and wetlands, for analysis purposes, will be the proposed project areas. This area represents past, present and foreseeable activities which may have a cumulative effect on flood plains and wetlands.

WATER QUALITY

The Utah Department of Environmental Quality designations (Rule R317-2; Standards of Quality for Waters of the State; As in effect on March 1, 2010) for the Project Area waters are listed below.

Category*	Use Designations**
Category 1	2B, 3A, 4

*High Quality Waters - **Category 1** Waters of high quality which have been determined by the Board to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection**.**

**Use Designations.

- Class 2 -- Protected for recreational use and aesthetics.
  Class 2B -- Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
- Class 3 -- Protected for use by aquatic wildlife.
  Class 3A -- Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

Water quality sampling for chemical and physical characteristics (STORET) of the water has been evaluated by the Utah Division of Environmental Quality (Division of Water Quality) and is in compliance with state water quality standards for the use designations of East Fork of Boulder Creek and its tributaries.

East Fork of Boulder Creek West Fork of Boulder Creek, and Boulder Creek are not listed on the most recent Utah 303(d)) List of Impaired Waters by Utah Department of Environmental Quality Division of Water Quality.

There are no drinking water surface protection zones or municipal watersheds directly within the East Fork of Boulder Creek, West Fork of Boulder Creek, and Boulder Creek watersheds from data received from the Utah Department of Environmental Quality Division of Drinking Water.

The closest irrigation water use associated from this project is 0.28 miles downstream of the terminus of the treatment area. Other irrigation water intakes and uses are further than 0.5 miles downstream from the project.

Antidegradation Policy

Maintenance of Water Quality

Waters whose existing quality is better than the established standards for the designated uses will be maintained at high quality unless it is determined by the Board, after appropriate intergovernmental coordination and public participation in concert with the Utah continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. However, existing instream water uses shall be maintained and protected. No water quality degradation is allowable which would interfere with or become injurious to existing instream water uses. In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Federal Clean Water Act.

Category 1 Waters

Waters which have been determined by the Board to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection shall be maintained at existing high quality through designation, by the Board after public hearing, as Category 1 Waters. New point source discharges of wastewater, treated or otherwise, are prohibited in such segments after the effective date of designation. Protection of such segments from pathogens in diffuse, underground sources is covered in R317-5 and R317-7 and the Regulations for Individual Wastewater Disposal Systems (R317-501 through R317-515). Other diffuse sources (nonpoint sources) of wastes shall be controlled to the extent feasible through implementation of best management practices or regulatory programs. Projects such as, but not limited to, construction of dams or roads will be considered where pollution will result only during the actual construction activity, and where best management practices will be employed to minimize pollution effects. Waters within this project area are listed as state designated Category 1 Waters.

The cumulative effects area for effects to water quality, for analysis purposes, will be three (HUC 6) watersheds, Headwaters Boulder Creek, Bear Creek – Boulder Creek,

and Deer Creek. This area represents past, present, and reasonably foreseeable actions which may have a cumulative effect on water quality.

ENVIRONMENTAL CONSEQUENCES

FLOODPLAINS/WETLANDS

No Action Direct, Indirect, and Cumulative Effects

The No Action alternative would not have any direct, indirect, or cumulative effects to wetlands or floodplains.

Proposed Action Direct, Indirect and Cumulative Effects

There would be no filling or obstruction of floodplains or wetlands during the treatments under the Proposed Action. Rotenone does not affect aquatic or riparian vegetation. There would be no cumulative effects on floodplains or wetlands as a result of this alternative.

The Proposed Action would be consistent with the desired future condition and management direction for the (9A) riparian management area of the Land and Resource Management Plan for the Dixie National Forest.

Non-Chemical Treatment Alternative

There would be no filling or obstruction of floodplains or wetlands during the Non-chemical Treatment alternative. The Non-chemical Treatment alternative would not affect aquatic or riparian vegetation. A small pool would be created by the migration barrier to be installed on private property as part of the project. The Utah Division of Wildlife Resources would need to comply with regulations governing alteration of stream channels, including approval from the State Engineer and Army Corps of Engineers prior to construction of the barrier. There would be no cumulative effects on floodplains or wetlands as a result of this alternative.

This alternative would be consistent with the desired future condition and management direction for the (9A) riparian management area of the Land and Resource Management Plan for the Dixie National Forest.

WATER QUALITY

No Action Direct, Indirect, and Cumulative Effects

There would be no direct, indirect, or cumulative effects to water quality under the No Action Alternative. Rotenone would not be used to treat the project area waters. None of the Beneficial Uses designated for the project area waters would be affected.

Proposed Action Direct and Indirect Effects

There would be short-term direct effects to water quality relating to the Utah State Use Designation Class 2B designation of beneficial uses as a result of the chemical treatment with rotenone. The primary direct effect would be to infrequent primary contact recreation, which includes secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing. The design criteria would be followed to mitigate for human recreational exposure to rotenone and also provide an operating protocol for public notification of treatment area restrictions prior to, during, and following application of rotenone. Rotenone dissipates in flowing waters relatively rapidly (often less than 24 hours) due to dilution and increased rates of hydrolysis and photolysis (Finlayson et Al. 2000, Brown 2010).

Rotenone is non-toxic to mammals, including humans. At the concentrations used to kill fish, it has been estimated that a 132-lb person would have to consume over 60,000 liters of treated water at one sitting to receive a lethal dose (Sousa et al, 1987). Using a safety factor of 1,000X and the most conservative safe intake level, a person could still drink 14 liters of treated water per day. In addition, extensive testing has not shown rotenone to be carcinogenic (Bradbury 1986). Even though rotenone has been shown to be safe to humans, as a matter of policy, the U.S. Environmental Protection Agency (EPA) does not set tolerances for pesticides in potable water. At the same time, the EPA has exempted rotenone from tolerance requirements when applied intentionally to raw agricultural commodities. The State of California (1994) and the National Academy of Science (1983) have computed "safe" levels of rotenone in drinking water that are roughly equivalent to the detection level of rotenone in water (0.005 ppm pure rotenone). Municipal drinking water supplies have been treated with rotenone in at least seven states including Utah.

There would be short-term direct effects to water quality relating to the Utah State Use Designation Class 3A designation of beneficial uses as a result of the chemical treatment with rotenone. The primary direct effect would be the toxicity of rotenone to aquatic organisms including fish and invertebrates. Rotenone dissipates in flowing waters relatively rapidly (often less than 24 hours) due to dilution and increased rates of hydrolysis and photolysis (Finlayson et. al 2000, Brown 2010).

Numbers of aquatic invertebrates, important to the aquatic ecosystem, would be temporarily suppressed. Areas upstream from the target waters or refugia left in the fishless portions of target waters would provide a source for rapid recolonization. Off-stream ponds, bogs, seeps and springs would be left untreated, serving as refugia for aquatic invertebrates. This would help insure the recolonization of the treated portions of the streams. The natural, downstream drift of aquatic insects generally results in the rapid recolonization of streams following their removal by natural or man-made events (Hynes 1972). Most or all of the invertebrate species would repopulate the treated area within one or two years (California Dept Fish and Game 1994). In the Strawberry River drainage, Utah, where the target concentration of rotenone was greater than that

planned for the project area, and where an attempt was made to treat all water in the drainage, about 75% of the number of species present before the treatment had recovered after 3 years (Dr. Fred Mangum, USFS Intermountain Region Aquatic Ecosystem Lab, pers. comm., 1995).

Whelan (2002) reviewed the effects of the 1995 and 1996 rotenone treatments on Manning Creek, Utah. The Manning Creek treatment had lower target concentrations of rotenone and lower application times than the Strawberry treatment studied by Mangum. Whelan (2002) indicated that leaving fishless stream reaches untreated and using the minimum rotenone concentration and treatment time necessary to achieve the objectives of trout removal were reasonably effective mitigation measures to speed aquatic macroinvertebrate recovery, when compared to the Strawberry treatment. The majority of taxa recovered and was found in the post-treatment samples. Interestingly, many taxa were only found post-treatment. Finally, while a few individual taxa were not found post-treatment, Whelan (2002) noted "there were almost as many taxa found in 1988 and 1990 that were missing by 1995 [immediately] prior to the treatment, as there were taxa found in 1995 that were still missing in 1999 after the treatment".

Engstrom-Heg et al. (1978) conducted a laboratory study of the rotenone tolerance of aquatic macrionvertebrates. They felt that a treatment of less than 10 ppm-hours would generally result in only mild and temporary damage to the aquatic macroinvertebrate community. This is a somewhat lower treatment level than the Manning Creek treatment was, but is within the general application rate and time of rotenone treatments conducted in recent years in southern Utah since the Manning Creek treatment. During collections of aquatic macroinvertebrate samples from Pine Creek in southern Utah only 5 days following a rotenone treatment at this lowest application level, many live aquatic macroninvertebrates were found.

Whelan (2002) reviewed aquatic macroinvertebrate literature for both rotenone treatments and natural disturbances. He found that aquatic macroinvertebrate responses to natural events were often similar to rotenone treatments. Natural disturbances faced by macroinvertebrates in the project area include snowmelt runoff and flooding, drought, monsoon season thunderstorm flood events, and wildfire. Floods can result in major movement of the streambed, greatly affecting macroinvertebrate population levels by scouring and deposition. Aquatic macroinvertebrates were essentially absent for months in Deep Creek following the Sanford fire on the Dixie National Forest. Rotenone treatments at low concentrations for short treatment times are likely less impacting to aquatic macroinvertebrates than major natural events. Whelan (2002) summarized mechanisms that aquatic macroinvertebrates have evolved to live in dynamic environments that make them potentially able to survive or persist through rotenone treatments. These include resistant egg stages, multiple overlapping generations, life stages that live deep in the in the gravel of the stream (hyporheic zone) with upwelling groundwater, life stages that live in silt or aquatic vegetation that binds up rotenone, and dispersal by winged adults from areas of refugia. Some taxa, especially those with low oxygen requirements, are relatively resistant to rotenone even as nymphs or adults.

The mobility of rotenone in soil is low. In fact, the leaching distance of rotenone is only 2 cm in most types of soils. This is because rotenone is strongly bound to organic matter, making it unlikely that it would enter ground water. At the same time, rotenone breaks down quickly into temporary residues that would not persist as pollutants of ground water. Ultimately rotenone breaks down into carbon dioxide and water.

A secondary indirect effect of the treatment would be a temporary increase in the nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for a period of approximately 2 weeks while decomposition occurred. However, natural mortality has always occurred in the target waters and the increase would be negligible with respect to the ecosystem. Some of the nutrients would likely be rapidly assimilated by rebounding aquatic macroinvertebrate populations.

The EPA approves rotenone for the use intended in this project, and it would be applied according to label instructions by personnel certified as Non-Commercial Pesticide Applicators. Changes in water quality during the project would not impair other uses. Rotenone would not affect plants and would still be of suitable quality for use by livestock, other mammals and birds.

Potassium permanganate would be used to detoxify rotenone during treatments at some of the project waters. Potassium permanganate would degrade to nontoxic, common compounds within an hour of application at the concentrations that would be used. The detoxification is not immediate in space, but requires a short mixing zone where the potassium permanganate is in contact with and oxidizes the rotenone. Below this mixing zone both fish and aquatic macroinvertebrates would survive (Brown 2010).

Drinking water supplies would not be affected by the use of potassium permanganate because it rapidly breaks down into potassium, manganese, and water. In addition, no target streams are used directly as municipal or culinary water sources.

There would not be direct effects to water quality relating to the designation of irrigation water and stock water (Utah State Use Designation Class 4) beneficial uses as a result of the chemical treatment with rotenone. The irrigation water uses are greater than 0.25 miles from this project. Design criteria include application in accordance with regulations and policy, such as mitigation measures outlined in the EPA rotenone re-registration document (EPA 2006). This would mitigate for irrigation and stock water exposure to rotenone.

The proposed action is consistent with the desired future condition and management direction for the (9A) riparian management area of the Land and Resource Management Plan for the Dixie National Forest.

Proposed Action Best Management Practices

The following best management practices (soil and water conservation practices) are Forest Service policy and, per design criteria, would be applied during the implementation of the Proposed Action.

PRACTICE: 13.07 - Pesticide Use Planning
OBJECTIVE: To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.
EXPLANATION: The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporates the hydrologic considerations contained in SWCP 13.08 through 13.11 and 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction. Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest locations, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.
IMPLEMENTATION: The interdisciplinary team has evaluated the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer will adhere implementation standards within the *"Planning and Standard Operating Procedures for the Use of Rotenone in Fish Management",* 2010.

PRACTICE: 13.08 - Apply Pesticides According to Label and EPA Registration Directions
OBJECTIVE: To avoid contamination by complying with all label instruction and restrictions.
EXPLANATION: Label directions for each pesticide are detailed and specific, and include legal requirements for use.
IMPLEMENTATION: Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirements are followed rests with the Forest Supervisor or a designate such as the Forest Pesticide Use Coordinator.

PRACTICE: 13.09 - Pesticide Application Monitoring and Evaluation
OBJECTIVE: To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of non-target areas or resources.
EXPLANATION: This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use, so as to minimize or eliminate hazards to non-target areas or resources. Type of

pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable Federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.
IMPLEMENTATION: The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. The fisheries biologist familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards and adequacy of project specifications.

PRACTICE: 13.10 - Pesticide Spill Contingency Planning
OBJECTIVE: To reduce contamination from accidental pesticide spills.
EXPLANATION: A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for the notification, how spills will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property, and the environment.
IMPLEMENTATION: The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

PRACTICE: 13.11 - Cleaning and Disposal of Pesticide Containers and Equipment
OBJECTIVE: To prevent contamination and risk to humans from cleaning and disposal of pesticide containers.
EXPLANATION: The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.
IMPLEMENTATION: When the pesticide is applied by In-Service personnel, the Forest or District Pesticide Use coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved disposal site.

PRACTICE: 13.13 - Controlling Pesticide Drift During Spray Application
OBJECTIVE: To minimize the risk of pesticide contaminating non-target areas.
EXPLANATION: Pesticide spray applications will be accomplished according to a prescription that specifies the following: areas to be left untreated, buffer areas, type of spray and associated materials, equipment and method to be used, droplet size, spray height, application pattern, flow rate, terrain and meteorological considerations.
IMPLEMENTATION: The prescription is prepared by an interdisciplinary team and the Forest or District Pesticide Use Coordinator during the NEPA process. The Line Officer is responsible for designating a project supervisor who is responsible for ensuring that

the prescription is followed during application and for terminating application if the standards are exceeded.

Proposed Action Cumulative Effects

There would be no cumulative effects to water quality as a result of this alternative. Stream flows would flush rotenone from streams or channels which are treated in approximately 12 hours after the application. None of the other actions listed in the project file have had a long term effect on water quality and the proposed action would not contribute any lasting effects.

The cumulative effects area for the Proposed Action is within the three (HUC 6) watersheds, Headwaters Boulder Creek, Bear Creek – Boulder Creek, and Deer Creek. This area represents the past, present, and foreseeable activities which may have a cumulative effect on water quality.

Past Activities
9,780 acres of past timber sales (Bear Creek, Deer Mountain, Garkane, Side Hollow and Dry Lakes Aspen Timber Sale) were harvested within the last 30 years along with approximately 2,500 acres of non-commercial thinning. The affects of these projects in regards to water quality was non-detectable. Water quality observations for streams associated with these projects have met Utah State Use Classification standards.

Four past fires (Deer Mountain, Short Neck, Steep Creek and Bear Creek) fires have burned 1,860 acres in the Deer Creek and Bear Creek – Boulder Creek watersheds. These wildfires have had short term negative water quality affects to the streams but have stabilized within two years after the fires due to the limited acres of these fires and revegetation potential of the immediate stream buffers. No exceedences of Utah State Use Classification standards were documented.

Present Activities
Numerous grazing permits are within the cumulative effects area (15,500 acres in the Bear Creek-Boulder Creek Watershed, 33,972 acres in the Headwaters Boulder Creek watershed and 27,693 acres in the Deer Creek watershed). Grazing that does occur on the district is managed under proper use guidelines to protect water quality standards.

Road and trails within the cumulative effects area (CEA) are approximately:

- 42 miles of High Clearance Vehicle Roads (ML2)
- 1 mile of Suitable for Passenger Cars Road (ML3)
- 5 miles of Seasonal Closed Roads
- 35 miles of Administrative Roads (ML1)
- 61 miles of Roads Designated to be Closed
- 39 miles of Non-Motorized Trails
- 17 miles of Highway (Utah Hwy 12)
- 16 miles of Private Roads

Current road maintenance within the CEA has only occurred after the Bear Creek wildfire and on Forest Road 165 (Kings Pasture Road) and 166 (Haws Pasture Road) road resurfacing projects which have assisted in maintaining proper water drainage. Additional work has just been completed on Forest Road 166 with the bridge construction over East Fork Boulder Creek, this project has re-established the constricted channel to proper width configuration and streams pool dynamics acceptable for aquatic passage.

Foreseeable Activities

Two timber sales/vegetation management project are within the foreseeable future. Sawmill Aspen Vegetation Management (815 acres) and Road Draw Salvage Sale (82 acres) have effectively buffered any treatments from streams in the area to protect the water quality.

Road closures within the next five years are also expected, and this project will also protect water quality in the CEA.

Non-Chemical Treatment Alternative Direct and Indirect Effects

There would be a temporary increase in turbidity immediately downstream from the barrier construction site and with the stream electrofishing reaches from human foot traffic. The most increase would be limited to a short reaches directly below the foot disturbance sites and be limited to a moving disturbance, short duration for any one place at a time, along the entire length of stream channel, with some disturbance occurring over the course of 80 days (four 20 day treatments) per year.

A secondary indirect effect of the treatment would be a temporary increase in the nutrients from fish burial as a result of decomposition of fish that are killed. This effect would occur for a period of approximately 2 to 6 weeks while decomposition occurred. The burial sites from non-native fish will be 300 feet from the stream channel and be dispersed and negligible with respect to the ecosystem.

This alternative is consistent with the desired future condition and management direction for the (9A) riparian management area of the Land and Resource Management Plan for the Dixie National Forest.

Non-Chemical Treatment Alternative Cumulative Effects

There would be no cumulative effects to water quality as a result of this alternative. None of the other actions listed in project file have had an effect on water quality, and this alternative would not contribute any lasting effects.
The cumulative effects area and the past, present, and foreseeable activities which may have a cumulative effect on water quality are the same as for the Proposed Action.

COMPLIANCE WITH OTHER LAWS

Clean Water Act

The Clean Water Act (CWA) requires each state to implement its own water quality standards. The State of Utah's Water Quality Antidegradation Policy requires maintenance of water quality to protect existing instream Beneficial Uses on streams designated as Category 1 High Quality Waters. All surface waters geographically located within the outer boundaries of the National Forest, whether on private or public lands are designated as High Quality Waters (Category 1). This means they will be maintained at existing high quality. Application of rotenone is considered a point source; however, design criterion #4 of the Proposed Action would require UDWR to obtain all necessary approvals, including those to meet CWA requirements. Non-point sources will be controlled to the extent feasible through implementation of Best Management Practices (BMPs) or regulatory programs of the Utah Division of Water Quality. The State of Utah and the Forest Service have agreed through a 2009 Memorandum of Understanding to use Forest Plan Standards & Guidelines and the Forest Service Handbook (FSH) 2509.22 Soil and Water Conservation Practices (SWCPs) as the BMPs. The use of SWCPs as the BMPs meets the water quality protection elements of the Utah Nonpoint Source Management Plan.

The Beneficial Uses and High Quality of water in the streams draining the Project Area would be maintained during and following project implementation through the proper implementation of BMPs (SWCPs) as described in the environmental consequences section.

Executive Order 11990 Of May, 1997

This order requires Federal agencies to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In compliance with this order, Federal agency direction requires that an analysis be completed to determine whether adverse impacts would result.

The locations of wetlands in the Project Area were identified in the delineation and inventory of critical watershed areas. No ground disturbing activities will occur within 50 ft of any wetland, seep, or spring. With a 50 ft buffer area around any wetlands, seeps, or springs and implementation of SWCPs and BMPs, any of the alternatives would be in compliance with Executive Order 11990.

Executive Order 11988 Of May, 1977

This order requires Federal agencies to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modifications of floodplains and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by floodplains. In compliance with this order, the Federal agency requires an analysis be completed to determine the significance of Proposed Actions in terms of impacts to flood plains.

Ground disturbing activities will be limited to a small zone at barrier sites. Barriers will be constructed of large native rock and will mimic natural boulder plunge-pool habitats. Barriers will be keyed into adjacent banks to prevent erosion and promote development of a new floodplain above the structure. Disturbed areas will be revegetated. No new roads will be established. Therefore any of the proposed alternatives will be in compliance with Executive Order 11988.

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Appendix 1. Project Area and Alternatives Analyzed in Detail

The following describes and compares the Forest Service alternatives analyzed. It includes a description of the UDWR's proposed project and considers UDWR's treatment alternative in detail. This section also presents the alternatives and the UDWR activities that would be authorized or connected actions to the alternatives in comparative form.

Project Area

The proposed East Fork Boulder Creek Native Trout Restoration Project (project) is located approximately 7 miles northwest of Boulder, Utah (see Figure 1). The total treatment area is as follows:

- approximately 7.8 miles (12.6 km) of East Fork Boulder Creek from the natural barrier (below headwater meadow) on East Fork Boulder Creek to its confluence with West Fork Boulder Creek;

- approximately 0.2 miles (0.4 km) of lower West Fork Boulder Creek, from a previously constructed barrier to its confluence with East Fork Boulder Creek;

- approximately 0.5 miles (0.8 km) of Boulder Creek from the confluence of East Fork Boulder Creek and West Fork Boulder Creek downstream to a previously constructed fish barrier;

- all seeps and springs flowing into those sections of streams proposed for fish removal; and

- the Garkane Energy water transfer pipeline between the West Fork Reservoir and King's Pasture Reservoir; King's Pasture (East Fork) Reservoir; a pond on private property in King's Pasture, and the Garkane Energy penstock, between King's Pasture Reservoir and the Garkane Energy Boulder Creek Hydroelectric Power Plant (main power plant).

The treatment stream reaches flow through portions of Sections 27, 28, 33, and 34 of T31S, R4E, and Sections 3, 10, 15, 21, 22, and 28 of T32S, R4E, Salt Lake Baseline Meridian. Treatment would include connecting waters, including relatively large inflows or tributaries with permanent fish habitat and smaller springs and seeps that are capable of at least temporarily holding small fish. Known tributaries and inflows vary in length from 10 meters to over 750 meters.

The reaches on NFS-lands are all on the Escalante Ranger District of the Forest in Garfield County, Utah. The inflow of the water transfer pipeline is at the West Fork Reservoir in Section 8, T32S, R4E, and the outflow is at King's Pasture Reservoir in Section 10 of T32S, R4E. The inflow of the penstock is at King's Pasture Reservoir, and the outflow is at the main power plant in Section 35 of T32S, R4E.

No Action- No Further Treatment Scenario

Under the No Action alternative, the Forest would not approve the pesticide use permit to UDWR, would not authorize UDWR to use motorized vehicles off of designated routes for the application of rotenone to waters of the treatment area on NFS lands, and would not approve a special use authorization for UDWR to bury removed fish.

The No Action alternative would not preclude UDWR from implementing actions on NFS lands that would meet the purpose and need for UDWR's project but do not require Forest Service authorization. This includes UDWR activities described under the Non-chemical Treatment alternative (Section 2.1.3) except for the use motorized vehicles off of designated routes or burial of removed fish on NFS lands. The No Action alternative would also not preclude UDWR from implementing actions on non-NFS lands that are related to the purpose and need for UDWR's project but not under Forest Service jurisdiction or authorization.

One possible option for UDWR is to take no further action to meet the purpose and need of the proposed project. This possible option is identified in this analysis as the "No Action - No Further Treatment Scenario" and is the basis for the effects analysis for the No Action alternative to provide the base line for comparison of expected future conditions if neither the Proposed Action nor Non-chemical Treatment alternative were implemented by the Forest and UDWR were to take no further action to meet the purpose and need.

Proposed Action

The Proposed Action is to approve the pesticide use permit that the Forest Service requires the UDWR to have to apply the fish toxicant rotenone to waters that flow on NFS lands and to authorize motorized vehicle use off of designated routes. The pesticide use permit would authorize the UDWR to implement a maximum of three treatments on NFS land, one treatment per year for three consecutive years. Waters on NFS land that would be treated by UDWR under the Forest Service pesticide use permit are as follows:

- approximately 7.8 miles (12.6 km) of East Fork Boulder Creek from the natural barrier (below headwater meadow) on East Fork Boulder Creek to its confluence with West Fork Boulder Creek;

- approximately 0.2 miles (0.4 km) of lower West Fork Boulder Creek, from a previously constructed barrier to its confluence with East Fork Boulder Creek;

- approximately 0.5 miles (0.8 km) of Boulder Creek from the confluence of East Fork Boulder Creek and West Fork Boulder Creek downstream to a previously constructed fish barrier; and

- all seeps and springs flowing into those sections of the stream reaches specified in the permit.

The UDWR activities that would be authorized by the Forest under the Proposed Action would completely eradicate non-native trout from East Fork Boulder Creek, a short segment of Boulder Creek, and a very short segment of West Fork Boulder Creek. All fish would be temporarily eliminated by UDWR from target waters. Use of motorized vehicles by UDWR off of designated routes may be needed to facilitate placement of equipment, especially neutralization equipment, in effective locations.

Several actions that are not part of the Forest Service decision are connected to the UDWR project, as follows. UDWR is proposing chemical treatment of connected waters on private property to meet the purpose of the UDWR project. Following fish removal, UDWR would introduce the CRCT into the treated stream segments to establish self-sustaining populations. Sterile hybrids of species of non-native trout

may also be stocked by UDWR at some locations following the treatments to provide sport fishing opportunities while native trout become established. The following describes the UDWR project in detail, including identification of those actions that do not require Forest Service authorization.

Chemicals. Liquid emulsifiable rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172) would be used by UDWR to treat target waters. Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long-term effects on the environment (Sousa et al 1987). When used at the concentrations planned for the UDWR project, rotenone is a naturally occurring fish toxicant that is toxic to only fish, some aquatic invertebrates, and some juvenile amphibians. EPA found it to be not toxic to humans, other mammals, and birds at the concentrations used to remove fish (EPA 2007). It has been widely used in the United States since the 1950's. UDWR has used rotenone successfully in many similar projects and has refined application techniques to minimize adverse side effects to the environment (Hepworth et al. 2001a, Hepworth et al. 2001b, Hepworth et al. 2001c, Ottenbacher and Hepworth 2001, Chamberlain and Hepworth 2002a, Chamberlain and Hepworth 2002b, Chamberlain and Hepworth 2002c, Fridell et al. 2004, Fridell et al. 2005, Fridell and Rehm 2006).

Potassium permanganate would be used by UDWR to neutralize the rotenone at suitable locations to prevent the movement of rotenone into non-target waters. Potassium permanganate was selected, because it is a strong oxidizer that breaks down into potassium, manganese, and water. All are common in nature and have no deleterious environmental effects at the concentrations that would be used for the UDWR project activities, including those that would be authorized by the Forest under the Proposed Action (Finlayson et al. 2000). Potassium permanganate is used as an oxidizing agent in treatment plants to purify drinking water (EPA 1999). Although the oxidation process is not immediate, neutralization should occur within an estimated 0.25 to 0.5 miles of the neutralization site.

A more detailed description of the chemicals that would be used for the UDWR project activities, including those that would be authorized by the Forest under the Proposed Action, can be found in specialist report on Chemicals and Application of the Proposed Action.

Application. Liquid rotenone would be applied by UDWR at a rate of 0.5 to 2.0 ppm. In the pond and reservoir, liquid rotenone would be dispersed from personnel on small water-craft using pressurized backpack spray units. For flowing waters, seeps, and springs, liquid rotenone would be applied using a combination of 30 gallon and 5 gallon dispensers with constant flow drip-heads at approximately 50 to 60 stations throughout the UDWR project area over a 3 to 24 hour period (Finlayson et. al 2000, Ottenbacher et al. 2009). One 30 gallon drip station would be used by UDWR at each at the following:

- lower end of the headwater meadow at the upstream end of the UDWR project area,
- approximately halfway between the headwater meadow and King's Pasture Reservoir,
- immediately below King's Pasture Reservoir, and
- at the intake for the water flow pipeline between the West Fork Reservoir and King's Pasture Reservoir.

Five-gallon drip stations would be located by UDWR at approximately 1 mile intervals, beginning one mile below King's Pasture Reservoir and ending 1 mile upstream from the fish barriers on the main stem of East Fork Boulder Creek, and at all major springs and seeps within the UDWR project area. The interval placement of drip stations on the main stem of East Fork Boulder Creek would be to facilitate efficient travel time of chemicals. Depending on flow volume, a single 30 gallon or 5 gallon drip would be placed by UDWR on the lower fish barrier on West Fork Boulder Creek. Pressurized backpack sprayers would be used by UDWR to apply a diluted solution of the chemical to springs and backwater areas containing fish that were not effectively treated by boat or drip station.

Rotenone would be neutralized by UDWR with potassium permanganate downstream from target waters. Three sites are planned: where the penstock water is released at the upper power plant, where water is released at the main power plant, and at the fish barrier at the lower end of the treatment area. Each site would have a main neutralization station and at least one contingency neutralization station to ensure effectiveness. The neutralization stations would prevent rotenone from escaping the target area, except for the estimated 0.25 to 0.5 miles downstream in which the neutralization or natural degradation of rotenone would be occurring.

Post-treatment activity. Following confirmation of complete non-native trout removal, UDWR would reintroduce CRCT into project stream reaches from "core" CRCT populations or from fish produced by UDWR CRCT brood stocks. Sterile hybrids of species of non-native trout may also be stocked by UDWR at some locations following the treatments to provide sport fishing opportunities while native trout become established. All UDWR transfers or stocking of fish would comply with Utah Department of Agriculture and Food rules and UDWR policies.

Design Criteria. The following design criteria would be implemented and included in the Forest Service authorizations:

1. Stream sections will be treated in the fall to minimize impacts on non-target wildlife species (amphibians, insectivorous birds and bats). The fall treatment period will also minimize the impacts on sport fishing recreation.

2. Each treatment will be preceded by internal and external notifications and media releases to notify the public of treatment sites and dates and will include the following: notification of the Boulder Town Council, notification of private landowners in the treatment area, and news releases in local papers.

3. The treatment area will be placarded to prohibit public access during treatment and for at least 3 days following treatment.

4. Application of the chemical will be conducted by licensed pesticide applicators in accordance with all applicable regulations and policies.

5. Access by motorized vehicles will be on National Forest System roads designated for motorized vehicle use to the extent possible. Any use of motorized vehicles off of designated routes will be minimal and will require written Forest Service approval.

6. Neutralization sites will be placed to maximize their effectiveness at preventing downstream escapement of rotenone.

7. Treated waters will remain open to fishing.

8. Transport to the site and storage of chemicals on the site will comply with FSH 2109.14.40 (Pesticide-Use Management and Coordination Handbook, Chapter 40 - Storage, Transportation, and Disposal).

9. Sentinel fish ("in situ bioassay") will be used for pesticide residues monitoring to determine the presence or absence of unacceptable environmental effects.

10. Treatments will be discontinued if the objective of complete removal of non-native trout from the project area has been met.

Actions connected to but not included in the decision. The following parts of the UDWR project, as described above, are not subject to Forest Service permit requirements, and therefore are not included in the Forest Service decision. Selection of the Proposed Action is for issuance of the pesticide use permit for the application of rotenone on NFS lands only. The following, however, are considered connected actions and thus included in the environmental analysis:

1. The proposed UDWR treatment area includes private property, including property owned by Garkane Energy; thus, this area is not under Forest Service jurisdiction. This includes approximately 1.4 miles of East Fork Boulder Creek, Kings Pasture Reservoir, and the pond in Kings Pasture. To meet the purpose and need of the UDWR project, these areas as well as the water in the transmission pipeline and penstock must be treated by UDWR. Forest Service approval of the pesticide use permit for UDWR to apply rotenone to waters on NFS land is not approval of UDWR activities on non-NFS lands; however, the Forest Service would not approve the pesticide use permit unless UDWR is able to complete its project by treating waters off of NFS land.

   The expectation is that the entire UDWR project treatment area would receive chemical treatment as described below, although the UDWR may decide to use another method or methods to achieve the treatment objective. FERC license order Section 4(e), item 16, condition 4, requires Garkane Energy to use its reasonable efforts to cooperate in the work of UDWR and other agencies to remove non-native fish and re-establish CRCT in the above stream sections. This cooperation has already been demonstrated through construction of the fish barriers and through the first chemical treatment of Kings Pasture Reservoir in 2009.

2. Stocking of fish is under the jurisdiction of UDWR; thus, the CRCT stocking is not under Forest Service jurisdiction. To meet the purpose and need of the UDWR project, the stream would need to be stocked by UDWR with CRCT from core populations or UDWR brood stock post-treatment.

   The expectation is that the post-treatment recolonization/stocking of CRCT would occur as described. The purpose and need for the UDWR project, including stocking with CRCT, is to implement conservation actions under the CRCT Conservation Agreement and Strategy, to which UDWR is a signatory. In addition, the Forest Service conditions regarding the non-native fish eradication and fish restocking were included in a 2006 settlement agreement relating to the FERC license conditions and signed by Garkane Energy, Forest Service, and UDWR.

3. Fishing regulations, including whether or not treated waters would remain open to fishing, is under the jurisdiction of UDWR.

   The expectation is that UDWR would manage the fishing regulations to meet the conservation actions under the CRCT Conservation Agreement and Strategy. UDWR recognizes the importance of the area to recreation users. Because of this, UDWR may also stock sterile hybrids of species of non-native trout at some locations following the treatments while native trout become established.

Non-chemical Treatment Alternative

Under the Non-chemical Treatment alternative, the Forest Service would authorize UDWR to use motorized vehicles off of designated routes and approve a special use authorization for UDWR to bury fish that are removed as necessary to implement a non-chemical treatment to remove non-native trout from waters on NFS land.

The non-chemical treatment methods would not involve the use of rotenone or other pesticides on NFS lands and, therefore, would not require Forest Service approval. The effects of the non-chemical treatment are being analyzed, because this option may be exercised by UDWR in the event that the Forest Service were to choose not to authorize pesticide use, and the approach would be a connected action to the authorization of the use of motorized vehicles off of designated routes and approval of a special use authorization for burial of removed fish. The other connected actions that would also not require new Forest Service action are described below. UDWR's non-chemical treatment and other connected actions may or may not occur under the No Action alternative if the UDWR were to use motorized vehicles only on designated routes. These UDWR actions also may or may not occur under the Proposed Action.

Under the Non-chemical Treatment alternative, UDWR would use electrofishing to remove non-native trout from the treatment waters on NFS lands. Except for possible motorized vehicle use off of designated routes and burial of removed fish, this alternative would not require Forest Service authorization.

Treatment area. The treatment area would remain the same as described in the Proposed Action.

Methodology and Equipment. Electrofishing would be used by UDWR to remove non-native trout from the treatment area on NFS lands. Electrofishing introduces an electric current into the water and is commonly used as a fish removal method. The electricity causes an involuntary muscle contraction in the fish, attracting them toward the source of the electricity (electrode). Workers with long-handled nets then collect the stunned fish. Voltage, amperage, pulse frequency, and waveform are manipulated to maximize effectiveness, which can be influenced by water flow and velocity, temperature, clarity, conductivity (dissolved mineral content), and substrate. Other factors influencing effectiveness include the fish size, species and behavior, presence of aquatic vegetation, time of year, and time of day. It is most effective in shallow water and is, therefore, most commonly used in rivers and streams and occasionally in the shallow water zones of lakes.

Electrofishing removal would be accomplished by UDWR using multiple Smith-Root LR24 backpack electrofishing units or their equivalent from another manufacturer. Block nets of sufficient width would be set up to prevent fish emigration during removal activities. Dip nets, buckets, and live wells would

also be necessary for capture and removal of brook trout (*Salvenlinus fontinalis*) and capture and safe holding of CRCT.

Removal activities. Mechanical removal of non-native trout species using backpack electrofishing has been attempted in several other projects (Moore et al. 1986, Meronek et al. 1996, Thompson and Rahel 1996, Buktenica et al. 2000, Kulp and Moore 2000, Shepard et al. 2002, Peterson et al. 2004, Moore et al. 2005, Meyer et al. 2006, Earle et al. 2007). The results of these prior mechanical removal projects indicate: 1) achieving complete mechanical removal of trout in streams with the width, complexity, and number of small, heavily vegetated springs/tributaries found in East Fork Boulder Creek would be difficult; 2) success would be enhanced by implementing multiple-pass depletion removal efforts 3 to 4 times within the same year, and 3) success would be enhanced by treatment over multiple years (minimum of 2). For this UDWR project, the multi-year removal effort would involve a minimum of 5 to 6 people conducting multiple-pass removal efforts for the majority of summer and early autumn (late June to September) over a period of several years. While such removal efforts would undoubtedly cause major reductions in brook trout density and biomass, they may or may not result in complete eradication. UDWR would begin CRCT reintroduction efforts only when no brook trout are found within the project area.

The electrofishing removal by UDWR would follow the population monitoring methods used by Utah State University's Institute for Natural Systems Engineering, Utah Water Research Lab (INSE) during their Garkane-funded fish population monitoring on the Boulder Creek system (Hardy et al. 2009a, Hardy et al. 2009b). Personnel would electrofish approximately 100-meter reaches in 8.5 miles of the mainstem of East Fork Boulder Creek, West Fork Boulder Creek, and Boulder Creek along with all spring inflows and tributary streams. A block net would be placed across the upstream and downstream end of each reach to increase capture efficiency by preventing emigration. Up to 4 passes, or until no fish were collected, would be completed through each reach. Each pass would involve all personnel walking in the stream channel and on the banks while applying constant electric current to the water from at least two backpack electrofishers. All organisms within the stream would be subjected to the electric field. All non-native brook trout would be removed from the system, killed and buried. Any CRCT collected would be held in buckets/live wells and returned to the stream after completion of the 4 pass removal.

Effort. One crew would consist of at least 2 personnel using backpack electrofishers, 2 netters retrieving stunned fish, and 1 person with a bucket receiving and disposing of fish. Electrofishing batteries would be recharged using small gasoline powered generators. Based on their previous monitoring efforts, INSE estimated that in a 40 hour work week, 9 sites that were each 100 m long could be completed by a 5 to 6 person crew using the four pass methodology (C. Williams, Institute for Natural Systems Engineering, personal communication with M. Golden, Dixie National Forest, 3/12/2010). Based on this INSE estimate, for UDWR fish removal activities under the Non-chemical Treatment alternative, one removal effort on the 11.5 km mainstem stream (12.8 reaches, 900 m long) on NFS land would require approximately 512 hours (12.8 reaches times 40 hours) or 63 days (8 hours per day) to be completed by a 5 to 6 person crew using the four pass method. An additional effort of approximately 13 days would be needed to treat the 2.3 km mainstem on private property.

Because UDWR's removal activities would need to occur between late-June or early July and September to minimize access, weather, and high stream flow issues, each removal effort would be limited to approximately 20 days to be able to conduct 4 removal efforts in a single year. To be able to treat the entire mainstem stream, on NFS lands and private lands, during any one removal effort, 20 people (four

5-person crews) would be needed. For four removal efforts, this would total up to 80 days per year. As described below, UDWR may need up to 10 years of removal effort under this method.

During the UDWR's 2009 chemical treatment of East Fork Boulder Creek above King's Pasture Reservoir, 23 relatively large inflows or tributaries with permanent fish habitat were identified, along with many smaller springs and seeps capable of at least temporarily holding small fish. These tributaries and inflows varied in length from 10 m to over 750 meters. Additional inflows and tributaries that contain fish habitat are probably present in the reach below Kings Pasture and could add another 30 days or more to the estimated treatment time.

Efficiency of fish removal by electrofishing is substantially lower in certain types of habitats found in the treatment area, especially those with heavy aquatic vegetation, root wads, woody debris, and boulder fields. The time for one removal effort in these types of areas could be higher, and effectiveness could be lower. Also, in order to eliminate the possibility of fish moving between treated and untreated reaches, crews would need to operate simultaneously, which may negatively impact fish-removal efficiency, as stream bed disturbance from upstream crews would impact water clarity and visibility for downstream crews. Because of reduced removal efficiency with electrofishing as the fish removal method, the UDWR project may extend to 10 years.

Post-Fish Removal activities. Post-fish-removal activities by UDWR would be the same as those described for the Proposed Action.

Design Criteria. The following design criteria would be included in the written authorization for use of motorized vehicles off of designated routes and the special use authorization for the burial of removed fish:

1. State of Utah decontamination protocols for prevention of the spread of Aquatic Nuisance Species will be followed for all gear and personnel involved with the removal project.

2. The Forest Archaeologist will be consulted about potential locations to bury fish to avoid impacts to cultural resources.

3. Dead fish collected will be buried no closer than 300 feet from the stream and away from known camping areas to minimize bear/human interactions.

4. Access by motorized vehicles will be on National Forest System roads designated for motorized vehicle use to the extent possible. Any use of motorized vehicles off of designated routes will be minimal, and will require written Forest Service approval.

5. Trails will be used whenever possible to move from one location to another to minimize soil and vegetation disturbance and to prevent establishing new trails.

6. Sensitive plant habitat will be avoided during action implementation.

7. Personnel will ensure reach being treated is void of livestock and people not involved with the operation. Treated waters will remain open to fishing.

Actions connected to fish removal actions on NFS lands. The following parts of the UDWR project, as discussed above, are not subject to Forest Service permit requirements, and therefore are not included in the Forest Service decision. They are considered connected actions to UDWR's fish removal activities on NFS lands and thus included in the environmental analysis:

1. As described for the Proposed Action, the UDWR treatment area includes private property, including that owned by Garkane Energy; thus, this area is not under Forest Service jurisdiction.

   The expectation is that under the Non-Chemical Treatment alternative, the UDWR would implement non-chemical treatment methods on non-NFS lands, as described below, although the UDWR may decide to use another method or methods to achieve the treatment objective on the private lands or not pursue treatment on the private lands. The flowing portions of the project area on private lands would undergo similar electrofishing removal by UDWR, as described for NFS lands above.

   For the non-flowing portions of the project area on private lands, electrofishing would not be effective in removing brook trout from King's Pasture Reservoir or the pond in Kings Pasture. To remove brook trout from these areas without use of chemicals, UDWR would deploy experimental gill nets with many different mesh sizes at several locations and depths throughout each water body. Other studies where this method has been successful at eradicating brook trout suggest that it would take at least two and up to four seasons of semi-continuous netting to eliminate all size classes of trout from small lakes with relatively low trout densities (Knapp and Matthews 1998, Parker et al. 2001).

2. Potential recolonization from East Fork Boulder Creek would severely reduce the efficacy of removing brook trout from King's Pasture Reservoir; therefore, UDWR would need to construct a fish migration barrier in East Fork Boulder Creek on private property above King's Pasture Reservoir.

   The barrier would generally consist of a small check dam constructed of boulders and large rocks, creating a vertical drop of approximately 5 ft on the downstream side. The location for the barrier would be selected by UDWR to utilize any naturally occurring drops which can be enhanced and where the stream channel and floodplain are confined to minimize the size of the structure and the amount of water impounded behind it. Barrier construction would comply with laws, regulations, and permitting requirements of the State Engineer for stream channel alteration. Barrier materials would be taken from the ground surface, near the stream. The collection of these materials would not require excavation, stream alteration, or vegetation disturbance. If sufficient material is not available on site, additional materials would be hauled to the barrier site from an approved source.

   The barrier location would be selected by UDWR to minimize changes in stream gradient, hydraulic function, and water pooling. In addition, the barrier would be constructed by UDWR adjacent to existing roads where equipment access is acceptable, thus requiring little disturbance to surrounding areas. Riparian vegetation would be disturbed as little as possible during the construction of the barrier, while areas where surface disturbance would occur would be restored to pre-project conditions. The barrier would not be placed in areas of cultural or historic significance or in areas where sensitive, threatened or endangered

plants occur. It would be designed to operate under the natural fluctuations of a stream flow without routine maintenance. The barrier would be designed to pose little, if any, threat to the natural stream system or its associated riparian area so that if it were to fail, no damage would result to the stream environment. UDWR's maintenance could include the adjustment or replacement of individual rock materials, but such work would be minor. The barrier could be removed but only after treatment is determined to be fully successful.

Neither netting nor electrofishing are options for UDWR for removing any non-native trout that may be using the upper portion of the penstock inflow or the lower portion of the pipeline from the West Fork Reservoir during treatment efforts. Shutting off water to these areas until they were completely dry would be the only way to ensure complete eradication; however, this is not feasible (M. Avant, Garkane Energy, personal communication with M. Golden, Dixie National Forest, 4/1/2010). Because of this, the effectiveness of the rest of the treatment would be reduced, contributing to the likelihood of the longer period of treatment.

3. Stocking of fish by UDWR would be as described for the Proposed Action.

4. As described for the Proposed Action, fishing regulations, including whether or not treated waters would remain open to fishing, is under the jurisdiction of UDWR. The expectation is as described for the Proposed Action.

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Figure 1. Project area location